Remarks

Preliminary Matters

Claim 19 has been cancelled. No Claims have been added. Claim 7 is now an independent claim, but there are less than three independent claims. No additional fees are required. If determined otherwise, the Office is authorized to charge Deposit Account No. 07-1077 for the amount.

Allowable Claim 7

Applicants have amended Claim 7 to place it in condition for allowance. Depending on how Applicants' other Claims are examined by the Office, other Claims may be amended to depend from Claim 7 or be added to depend from Claim 7.

§ 103 Rejections

The following rejections were made.

1. Claims 1-3, 6, 8, 12-16, 18-19 using Dowlings (6,402,933)
2. Claims 1-3, 6, 8, 13-19 using Hoppe-Hoffler et al. (5,378,335)
3. Claims 4-5 using either Dowlings or Hoppe-Hoffler et al. with either Collins et al. "Carbon Nanotubes" or Baughman et al. ("Carbon Nanotubes")
4. Claims 9-11 using either Dowlings or Hoppe-Hoffler et al. with Huang et al. (5,650,060).

In response, Applicants have amended their claims and submit these remarks in support of those amendments.

Support for the amendments appears throughout the specifications and claims as filed. Movement of text from dependent claims to Claim 1 are apparent. Otherwise, specifically, the locations are:

"electrically inactive" -- Publication Para. [0046]/Application Page 6, Line 15

"greater than 10:1 aspect ratio" -- Publication Para. [0062]/Application Page 10, Line 6

"electron transfer agent" -- Publication Para. [0106]/Application Page 17, Line 13

"passive galvanic circuit" -- Claims 16 - 17; Publication Paras. [0007] [0067]/Application Page 2; Line 13 and Page 11; Line 5

"binder" -- Publication Para. [0020]/Application Page 4, Line 7

"removal of carrier" -- Publication Para. [0054]/Application Page 9, Line 4.

Rejection 1 using Dowlings

All rejections using Dowlings are overcome by the amendments which clearly claim the creation of a passive galvanic circuit, which is an unpowered circuit, naturally causing a reaction where the sacrificial metal particles dissolve rather than the metal substrate oxidizing. Dowlings discloses ***and requires*** an electronic filter connected to the coated conductive structure. That electronic filter requires a power source. The coating includes a ***conductive*** organic polymer and one or more metals or non-metallic semiconductor materials.

Dowlings never discloses or suggests (a) an *electrically inactive* flowable material or (b) any *carbonaceous* conductive media to be used an electron transfer agent in the galvanic circuit. Dowlings identifies the possibility of using carbon fibers, but as a "conventional filler." If one of ordinary skill in the art read Col. 5, Lines 10-11, only a 33% probability of using carbon fibers would follow. Certainly, no one would be motivated to use carbon fibers for electron transfer purposes in Dowlings because the entire coating starts with a semiconductive organic polymer. Using carbon fibers would be surplusage -- just what Dowlings call it: filler.

Applicants' Claims 1-3, 6, 8, 12-16, 18-19 are patentable over Dowlings because those Claims are for a cathodic protection compound which uses an electrically inactive flowable material having both carbonaceous conductive media and sacrificial metal particles dispersed therein. With the flowable material serving as an electrically inactive binder and the conductive media serving as an electron transfer agent, the sacrificial metal particles can oxidize away rather than the metal substrate on which the compound is coated.

Rejection 2 using Hoppe-Hoffler et al.

All rejections using Hoppe-Hoffler et al. are overcome because Claim 1 has been amended to recite the specific types of carbonaceous conductive media that Hoppe-Hoffler et al. never disclose, suggest, or contemplate.

Hoppe-Hoffler et al. are concerned about primary particle sizes for their carbon black and/or graphite to be less than 10 μm in primary particle size. Hoppe-Hoffler et al. never recognize or appreciate the value of having a conductive carbon material having a large aspect ratio, greater than 10:1 (Length/Width).

Applicants' passive galvanic circuit compound relies on carbon fibers, multiple-wall nanotubes, single wall nanotubes, and combinations of them, all having an aspect ratio >10:1, to provide THE means of electron transfer through the electrically inactive flowable material between the sacrificial metal particles and the metal substrate on which the compound is coated.

As seen in Applicants' Tables 2 and 3, Applicants have used elongated carbon materials -- fibers and tubes, to facilitate the electron transfer of the passive galvanic circuit as the coated metal substrates are exposed a salt spray test.

Hoppe-Hoffler et al. do not recognize the value of using high aspect ratio carbon materials because Hoppe-Hoffler et al. are concerned with electrodeposition painting, not the eventual cathodic protection via a galvanic circuit.

There is no place in Hoppe-Hoffler et al. where one of ordinary skill in the art would be encouraged to try other forms of carbon materials, and certainly not to employ high aspect ratio carbon materials for the purpose of electron transfer.

Indeed, there is no instruction in Hoppe-Hoffler et al. why there is a primary particle size upper limit. So, to depart from Hoppe-Hoffler et al. toward carbon fibers or carbon nanotubes would in a direction ***directly opposite*** of what Hoppe-Hoffler et al. teach.

Rejection 3 using Dowlings or Hoppe-Hoffler et al. with Carbon Nanotube Articles

The rejection of Claims 4-5 fail because the primary references of Dowlings

and Hoppe-Hoffler et al. fail in a way which the Carbon Nanotube articles can not restore. Dowlings does not even use carbon-based conductive materials. Hoppe-Hoffler et al. do not teach toward high aspect ratio carbon materials in a way that one of ordinary skill in the art would be motivated to select carbon nanotubes as the electron transfer agent for a passive galvanic circuit.

Rejection 4 using Dowlings or Hoppe-Hoffler et al. with Huang et al.

The rejections of Claims 9-11 fail for the same reasons as described above with respect to Dowlings or Hoppe-Hoffler et al. The dependent claims 9-11 recite additional ingredients which Applicants identify as valuable according to Huang et al. But Huang et al. does not contemplate passive galvanic circuit in which the sacrificial metal particles are dispersed within the electrically inactive flowable material. So, Dowlings, Hoppe-Hoffler et al. and Huang et al. all teach in different directions about cathodic protection coatings and there is nothing motivating one of ordinary skill in the art to combine them in the way the Office asserts.

Claims 1-6, 8-19 are patentable over all of the four rejections. Claim 7 was already patentable.

Applicants request a Notice of Allowance for Claims 1-19.

If there are any matters that prevent a Notice of Allowance, the Examiner is invited to contact the Undersigned by telephone.

Respectfully submitted by:

February 29, 2008
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